

WHAT IS CLAIMED IS:

1. An analyte detecting article for mounting on a surface of a packaging substrate and for detecting an analyte, comprising:

a facestock film having first and second surfaces;

an adhesive layer having first and second surfaces, and the adhesive layer first surface is adhered to the facestock film second surface, and the adhesive layer second surface being operable to adhere to the packaging substrate surface; and

a detecting system adjacent to the facestock film, and the detecting system is responsive to contact with the analyte by indicating that such contact has occurred.

2. The article of claim 1 wherein the detecting system comprises an immunoassay device.

3. The article of claim 2 wherein the immunoassay device comprises:

a capture antibody layer comprising a species of capture antibodies, which are applied in a predetermined pattern on the upper surface of the facestock film;

a porous detector antibody layer, comprising a species of detector antibodies corresponding to the capture antibodies, the detector antibody layer overlying the capture antibody layer, whereby simultaneous binding of one or more of the capture antibodies and one or more of the corresponding detector antibodies with the analyte results in a visual signal.

4. The article of claim 3 wherein the detector antibodies comprise a chromogenic ligand.

5. The article of claim 1 wherein the detecting system comprises a metal-complex containing sensor.

6. The article of claim 5 wherein the metal-complex containing sensor comprises a polyazamacrocyclic transition metal complex.

7. The article of claim 1 wherein the detecting system comprises at least one dye deposited onto the facestock in a predetermined pattern, wherein the dye has a distinct and direct spectral absorbance or reflectance determined by the presence or absence of the analyte, and wherein the dye is selected from the group consisting of porphin, chlorin, chlorophyll, phthalocyanine and salen, and their metal complexes.

8. The article of claim 7 wherein the upper surface of the facestock film defines microstructures configured to facilitate the transport of liquid or vapor to the detecting system.

9. The article of claim 1 wherein the adhesive layer is a pressure sensitive adhesive.

10. The article of claim 9 further comprising a release layer adjacent to the adhesive layer second surface.

11. The article of claim 1 further comprising an absorbent layer adjacent to the detecting system and supported by the facestock film first surface.

12. The article of claim 11 wherein the absorbent layer comprises an absorbent material selected from super-absorbent polymers, starch, and polyvinyl polymers, silicone-organic copolymer elastomers, activated alumina, calcium carbonate and silica gel.

13. The article of claim 1 wherein the facestock film is flexible and transparent.

14. The article of claim 3 further comprising a pigmented layer overlying the immunoassay device, the pigmented layer being operable to increase the contrast of an image formed in response to the analyte contacting the capture antibodies.

15. The article of claim 14 wherein the pigmented layer comprises a non-woven polymeric layer.

16. The article of claim 3 wherein the analyte is a predetermined pathogen, and the detector antibody layer further comprises a scavenger antibody having a higher affinity for the predetermined pathogen than for the capture antibodies, and the scavenger antibody is present in a sufficient amount to bind with the analyte up to and including a specific threshold concentration.

17. The article of claim 3 wherein the capture antibody layer is continuous or is in register with the detector antibody layer.

18. The article of claim 1 wherein the adhesive layer is permeable to the analyte.

19. The article of claim 1 wherein the adhesive layer is discontinuous to allow the analyte to move therethrough.

20. The article of claim 1 wherein the packaging substrate surface is an inner sidewall surface, and the detecting system is visible or detectable through the packaging substrate.

21. The article of claim 1 wherein the facestock film defines hollow protrusions that extend through the packaging substrate to define a path configured to allow the analyte to move from a monitored material to the detecting system.

22. The article of claim 1 wherein the analyte is selected from the group consisting of by-products or organisms of E. coli, ciguatoxin, salmonella, botulism, listeria, scrape ("mad cow disease"), campylobacter, shigella, cyclospora, anthrax, streptococcus Group A antigen, streptococcus Group B antigen, viral antigens, antigens associated with autoimmune disease, allergens, tumor antigens, HIV I or HIV II antigen, antigens specific to hepatitis, and corresponding antibodies thereof.

23. The article of claim 1 wherein the analyte is selected from the group consisting of biogenic amines, enzyme, hormone, saccharide, protein, peptide, lipid, carbohydrate, nucleic acid, hapten, phytochemicals, nutraceuticals, drugs of abuse, and therapeutic drugs.

24. The article of claim 1 wherein the analyte is selected from the group consisting of explosives, pesticides, solvents, inks and dyes, pigments, and herbicides.

25. The article of claim 1 wherein the detecting system comprises a binder, a plurality of particles and an indicator dye.

26. The article of claim 25 wherein the binder is a hydrophilic or hygroscopic polymer binder.

27. The article of claim 25 wherein the plurality of particles are a plurality of alumina particles having an average diameter in a range of from about 0.01 nanometer to about 1000 nanometers.

28. The article of claim 25 wherein the indicator dye is a polyazamacrocyclic transition metal complex.

29. The article of claim 28 wherein the transition metal is platinum or palladium.

30. The article of claim 25 wherein the detecting system comprises a patterned coating on at least one of the facestock film surfaces.

31. The article of claim 25 wherein the binder is present in the detecting system in an amount in a range of from 10 weight percent to 90 weight percent, the indicator dye is present in an amount in a range of from about 0.01 weight percent to about 5

weight percent, and the plurality of particles is present in an amount in a range of from about 10 weight percent to about 90 weight percent.

32. The article of claim 1 wherein the facestock film comprises paper or a polymeric film.

33. The article of claim 1 wherein the detecting system comprises a conductive ink layer comprising a conductive ink, electrical leads in electrical communication with the conductive ink layer, and an electrical signal monitoring device in electrical communication with the electrical leads, wherein the detecting system is responsive to contact with the analyte by indicating that such contact has occurred, the contact indication being a decrease in the amount of the conductive ink in the conducting layer, and the decrease in the amount of conducting ink in the conductive ink layer resulting in an increase in the electrical resistance of the conductive layer, and thereby generating a electrical signal to indicate that such contact has occurred.

34. An article for detecting an analyte, comprising:
a flexible facestock film having first and second substantially planar surfaces, wherein the first surface of the facestock film defines a micro-structure;
an adhesive layer having first and second substantially planar surfaces, wherein the adhesive layer first surface is adhered to the facestock film second surface; and
an immunoassay device is adhered to the facestock film first surface and oriented relative to the micro-structure, and the immunoassay device comprises:
a capture antibody layer comprising a species of capture antibodies, supported in a predetermined pattern on the facestock film first surface; and
a porous or perforate detector antibody layer, comprising a species of detector antibodies corresponding to the capture antibodies, the detector antibody layer overlying the capture antibody layer, whereby simultaneous binding of the capture antibodies and the corresponding detector antibodies with the analyte results in detectable signal.

35. The article of claim 34 wherein the detector antibodies comprise chromogenic ligands.

36. The article of claim 34 further comprising an absorbent layer in contact with the immunoassay device adhered to the facestock film first surface.

37. The article of claim 36 wherein the absorbent layer comprises a super-absorbent polymer.

38. An article for detecting an analyte, comprising:
a facestock film having first and second substantially planar surfaces;
an adhesive layer having first and second substantially planar surfaces, the adhesive layer first surface adhered to the facestock film second surface;
an immunoassay device supported on the facestock film first surface, the immunoassay device comprises:

a capture antibody layer comprising a species of capture antibodies, applied in a predetermined pattern on the facestock film first surface; and

a porous detector antibody layer, comprising a species of detector antibodies corresponding to the capture antibodies, the detector antibody layer overlying the capture antibody layer, whereby simultaneously binding the capture antibodies and the corresponding detector antibodies with the analyte results in the appearance of a visual signal; and

a hydrophilic or hygroscopic layer in contact with the immunoassay device.

39. The article of claim 38 wherein the fluid absorbing layer comprises an absorbent material selected from super-absorbent polymers, starch, and polyvinyl polymers, silicone-organic copolymer elastomers, activated alumina, calcium carbonate and silica gel.

40. A food package comprising the article of claim 38.

41. An article for detecting the presence of an analyte from a packaged material adjacent to a packaging substrate having an inner surface and an outer surface, comprising:

means for detecting the presence of an analyte, wherein the presence of the analyte is indicative of a condition of the associated packaged material; and

means for mounting the detecting means on the packaging substrate inner surface.

42. A detector system for detecting an analyte, comprising:

a transition metal complex;

a hydrophilic and water insoluble binder; and

a plurality of particles, wherein the transition metal complex, the binder and the particles form a layer that is responsive to contact with the analyte by indicating that such contact has occurred.

43. The system of claim 42 wherein the particles comprise alumina.

44. The system of claim 43 wherein the particles have an average diameter in a range of from about 0.01 nanometers to about 1000 nanometers, and the particle average diameter is selected to control the osmotic flow of fluid or vapor through the layer.

45. The system of claim 42 wherein the particles comprise titanium dioxide.

46. The system of claim 45 wherein the particles have an average diameter in a range of from about 0.01 nanometers to about 1000 nanometers, and the particle average diameter is selected to control the osmotic flow of fluid or vapor through the layer.

47. The system of claim 42 wherein the transition metal complex comprises a polyazamacrocyclic transition metal complex.

48. The system of claim 42 wherein the transition metal complex comprises palladium or platinum, and further comprises fluorescein.